

Work Order ID 63862

Wednesday, November 17, 2010 10:26:18 A

Page 1

Item ID: D407-667-205

Accept

Setup Start

Revision ID:

Stop

Item Name: Crosstube Aft

Start Date: 11/17/2010 Start Qty: 1.00

Cust Item ID:

Required Date: 11/30/2010 Req'd Qty: 1.00

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D407-667-245

Rev F

100

0.00



DC

Document Control

DOCUMENT CONTROL

Memo

0.00

Photocopy bluefile and create labels as per PPP D407-667-205 CHG006

Sublot 7

CK Pw BGR 11/01/07

110

0.00



Packaging

Packaging

Pick Kit

Packaging

Memo

0.00

DP 10-12-14

120

0.00



CNC Bend 1

CNC Delta 100 Bender

BENDING MACHINE - CROSSTUBES

Memo

0.00

1-Bend tube as per Dwg D407-667-245 using CNC bender program 407 Aft and

Folio

21

11/02/14

DP 10-12-14

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

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Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

130

QC15- Crosstube Dimensional Check

0.00



QC

Memo

0.00

Quality Control

810612114

70

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start
Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

140



Crosstubes

Crosstubes

Crosstubes

Memo

1-Drill pilot holes in tube using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Drill all (3) top holes.

2-Drill and Ream all holes in tube to finish size using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Check dimensions between holes on all four sides.

3-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.

4-Drill pilot holes using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Drill only the top (2) holes.

5-Drill & ream the top (2) holes to finish size using drill jig DT8583 & DT8584 as per Dwg D407-667-245

6-Drill Aft rivet holes using drill Jig DT8789 as per Dwg D407-667-245. Note: Aft side has 3x top holes.

7-Drill Fwd rivet holes using drill Jig DT8789 as per Dwg D407-667-245. Drill only the top (3) holes.

8-C'sink holes as per Dwg D407-667-245. Allow rivet to sit below surface to compensate for paint.

9- Scribe tube to identify on the inner chamfer in the cuff D# and B#

10-Deburr & Inspect for surface damage. Repair damage within limits as per

10-12-20

SAD
10-12-20

①

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Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Dwg D407-667-245

150

Crosstubes Chemical Conversion

0.00

SAD



HandFXtube

Memo

0.00

10-12-20

①

Hand Finishing Crosstubes

160

QC3- Inspect Part Finish

0.00

8/10/12/10



QC

Memo

0.00

Quality Control

170

QC5- Inspect part completeness to step on W/O

0.00

8/10/12/10



QC

Memo

0.00

Quality Control

④

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Run Start

Stop

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180

Outsource process - NDT per QSI038 4.1

0.00



Outsource2

Memo

0.00

Outsource process - NDT

Liquid Penetrant Inspection as per QSI 038O
Issue P/O: 13181 LPI as per ASTM 1417
Level 2 Attach copy of NDT results to work order

CZ 10/12/21 (1)

190

Packaging

0.00



Packaging

Memo

0.00

Packaging

Ensure copy of NDT results attached to work order.

RO 10/12/21 (1)

200

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

ml 10 12 21 (1)

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Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210	SprayPaint	0.00							
	SprayPaint	0.00							
	Spray Painting								
	Memo	0.00							
	1-Prime inside and outside crosstube as per QSI 005 4.2								
	2-Paint outside crosstube with White Imron as per QSI 005 4.2								
	PRIME:								
	Start Time: 7:00								
	Finish Time: 7:30								
	PAINT:								
	Start Time: 11:30								
	Finish Time: 12:30								
220	QC14- Inspect Spray Paint	0.00							
	QC	0.00							
	Quality Control								
	Then, Wrap in plastic bag to protect from scratches								

10 12 22 1

11-01-04

W/O:		WORK ORDER CHANGES					
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Customer:



Reference:

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Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
230		0.00							
	Crosstubes					<u>11</u>	<u>01</u>	<u>04</u>	<u>1</u>
Crosstubes									
Crosstubes	<p><i>11/01/05</i></p> <p>Memo</p> <p>1-Install abrasion strips as per QSI 035 using DT8674. Install chafing shield as per Dwg D407-667-245. Note: (3) top holes should be facing up.</p> <p>2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe</p> <p>3-Install support with magnobond and install clamps as per Dwg D407-667-245 using installation jig DT9025. Torque clamps to 80-100 in lb A/R Magnobond Batch: <u>115580</u> EXP: <u>07/2011</u></p> <p>4-Install nut plates as per Dwg D407-667-245. Touch-up rivet heads with Imron paint.</p>	0.00							
240									
	QC5- Inspect part completeness to step on W/O	0.00							
QC									
Quality Control	Memo	0.00							

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Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

250

Pick Kit

0.00



Packaging

Memo

0.00

Packaging

11/16/10

260

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

Subala

270

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and in kanban rack
Location: 53

Reo

11/17/10

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

280

QC21- Final Inspection - Work Order Release

0.00

QC

Memo

0.00

Quality Control

CK 11/01/07

MF

10-01-07

W/O:		WORK ORDER CHANGES					
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Page 1

[illegible]**Required Date:** 11/30/2017

Required Qty: 1.00

10.04.07 revise route seq. in bom DD verified by:JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D407-667-205TRN 		Manufactured	No		B63821	170	Each	0.0000	1	1		10-12-14	
Crosstube Turning Detail AN960JD516 	NAS1149D0563J	Purchased	No			230 250	Each	34.0000	18	18		11/16/14	
Washer													
					<u>Location</u>	<u>Loc Qty</u>		<u>Loc Code</u>					
					ST	34							
					103694	18							
					107534	12							
					109287	4							
D2856-400 		Manufactured	No			230	f	330.2530	1.288	1.355789		11-01-05	
Abraision Strip													
					<u>Location</u>	<u>Loc Qty</u>		<u>Loc Code</u>					
					ST403	330.2530421							
					56626	0.00004211							
					59920	114.253							
					63735	216							

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Picklist Print

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Work Order ID: 63862

Parent Item: D407-667-205

Parent Item Name: Crosstube Aft

Start Date: 11/17/2010

Required Date: 11/30/2010

Start Qty: 1.00

Required Qty: 1.00

D2873-043

Manufactured No

230

Each

32.0000

2

2



Nut Plate Assembly

Location

Loc Qty

Loc Code

LG

30

62380

10

63497

20

ST

2

60981

2

D2873-045

Manufactured No

230

Each

30.0000

2

2



Nut Plate Assembly

Location

Loc Qty

Loc Code

LG

30

60982

4

62378

6

63498

20

D2894-1

Manufactured No

230

Each

14.0000

1

1



2.750 Support

Location

Loc Qty

Loc Code

LG

14

43713

4

43881

10

D3190-1

Manufactured No

230

Each

26.0000

2

2



Chafing Shield

Location

Loc Qty

Loc Code

LG

26

47456

6

58569

20

W/O:		WORK ORDER CHANGES					
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Parent Item: D407-667-205

Parent Item Name: Crosstube .ft

Start Date: 11/17/2010

Required Date: 11/30/2010

Start Qty: 1.00

Required Qty: 1.00

D3595-063-450

Manufactured No

230 Each

58.9990

2 2



RUBBER CUSHION



11-01-04

63960

Location

Loc Qty

Loc Code

LG	58.99897368	
53775	5.97897368	
58161	3.56	
59580	0.12	
61465	29.34	
62535	20	

MS20601-AD4W8

Purchased No

230 Each

262.0000

14 14



RIVET



11-01-05

Location

Loc Qty

Loc Code

LG	158	
115855	58	
116119	100	
ST322	104	
112203	104	

MS21920-22

Purchased No

230 Each

42.0000

4 4



Clamp(per MIL-DTL-8783C)



11-01-05

Location

Loc Qty

Loc Code

LG	42	
114077	42	

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Shop Packet Print

Page 3

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Parent Item Name: Crcsstube Aft

Start Date: 11/17/2010

Required Date: 11/30/2010

Start Qty: 1.00

Required Qty: 1.00

MS21920-25

Purchased No

230 Each

107.0000

2

2



ml 11-01-04

Clamp(per MIL-DTL-8783C)

Location	Loc Qty	Loc Code
LG	83	
113281	0	
114759	5	
114901	3	
115278	25	
115849	50	
ST451	24	
113281	5	
113282	18	
113744	1	

AN5-10A

Purchased No

260 Each

252.0000

10

10



11/16/10

Bolt

Location	Loc Qty	Loc Code
ST337	252	
115429	15	
115589	100	
115700	137	

AN5-32A

Purchased No

260 Each

252.0000

4

4



11/16/10

Bolt

Location	Loc Qty	Loc Code
ST340	252	
114405	42	
115016	50	
115108	50	
115589	60	
115698	50	

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Parent Item Name: Crosstube Aft



Start Date: 11/17/2010

Required Date: 11/30/2010

Start Qty: 1.00

Required Qty: 1.00

AN5-34A

Purchased

No

260

Each

68.0000

4

4



Bolt



11/1/09

Location

Loc Qty

Loc Code

ST340

68

113149

2

113226

26

115835

20

116003

20

4

MS21042L5

Purchased

No

260

Each

1,373.000

4

4



Nut



11/1/09

Location

Loc Qty

Loc Code

ST139

26

114813

26

ST300

1347

115156

147

115594

500

116104

200

116105

500

4

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

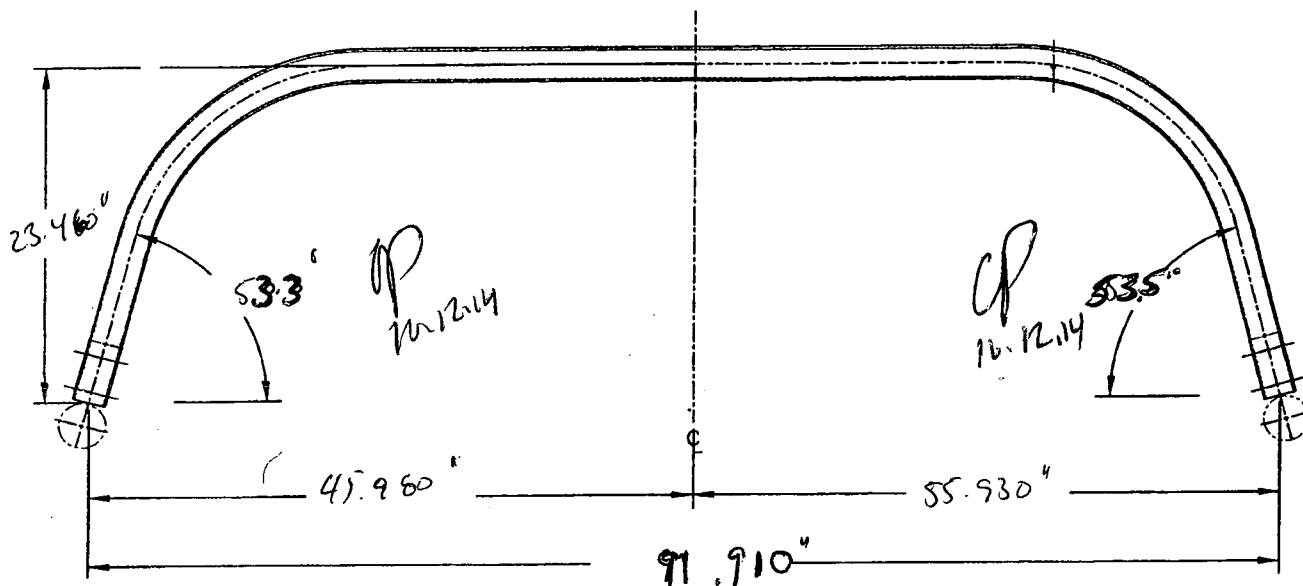
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	63862
Description: Crosstube High Aft (407)		Part Number:	D407-667-205
Inspection Dwg: D407-667-245 Rev: F		Page 1 of 1	

Required Dimension	Min	Max
Height	23.46	23.58
1/2 Span	45.86	45.98
Angle	54	56
Total Span	91.72	91.96



Comments
ANGLES UNDER TOL. ACCEPTABLE P 10/12/14 Q5/041

QC15 Inspection	S
Date	10/12/14

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	09.06.22	Dwg Rev updated	KJ	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Item	QTY -245	PART NUMBER	DESCRIPTION
1	X	D407-667-245	CROSSTUBE ASSEMBLY (407 HIGH AFT)
2	1	D6011-115	CROSSTUBE
3	2	D2856-400-773	ABRASION STRIP
4	2	D2873-043	NUT PLATE
5	2	D2873-045	NUT PLATE
6	1	D2894-1	SUPPORT
7	2	D3190-1	CHAFING SHIELD
8	2	D3595-063-430	RUBBER CUSHION
9	14	MS20601AD4W8	RIVET (OR NAS9302B-4-8)
10	4	MS21920-22	CLAMP
11	2	MS21920-25	CLAMP (OR MS21920-24)
12	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947- 100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6011-115
FINISHED LENGTH = 112.91±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D407-667-245" AND BATCH NUMBER ON
INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 27.7 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 6 PASSES. MAXIMUM TUBE FLATTENING DUE TO
BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2894-1 CENTER SUPPORT USING A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND
6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO
PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS WITH D3595-063-430 RUBBER CUSHIONS TO SECURE D2894-1
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE
SUPPORT.
NOTE: MS21920-24 CLAMPS CAN BE USED TO ACCOMMODATE VARYING DIAMETERS.
ENSURE THERE IS A MINIMUM OF 1.5 THREADS IN SAFETY ON THE NUTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS
SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT
LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF
CROSSTUBE, PER QSI 035.
- 16) INSTALL D3190-1 CHAFING SHIELDS SO THAT OVERLAP IS ON BOTTOM SIDE OF CROSSTUBE
OPPOSITE D2894-1 SUPPORT.
- 17) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN
SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER

NO. *63862*
BS 10-11-17

RELEASED
8/11/12 N/A

F	REFORMAT NOTES TO NEW STANDARDS (ZN B8-1); RELOCATED FLAG # 6 (ZN A8-3) PER NCR 210; REMOVED REF. & ADD TOLERANCES (ZN C6-3, C4-3 & D2-3)	RF	08.11.06
E	8.02 AND 8.53 WERE 8.40 AND 8.90 (ZN D5-2); REORGANIZED VIEWS AND REFORMATED DRAWING TO CURRENT STANDARDS. REASONS: CLAMPS MOVED 0.375 TOWARD CL TO ELIMINATE INTERFERENCE WITH AIRCRAFT MOUNTS. REFERENCE: PAR#08-21 AND ECN#1225	MB	08.07.24
D	ADD VIEW FOR OEM SKID HOLES, ROTATE ORIENTATION OF CLAMPS SECTION F-F, REMOVE -851 ABRASION STRIP, ADD MAGNOBOND 6398, ADD CUSHION	PH	07.02.07
C	ADD HOLES AND NUT PLATES FOR COMPATIBILITY WITH BHT/AA SKIDTUBES	PH	05.07.26
B	ADD CHAFING SHIELD	CP	03.05.21
A	NEW ISSUE	CP	02.05.13
REV.	DESCRIPTION	BY	DATE
DESIGN	<i>JP</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	<i>JP</i>	DRAWING NO.	REV. F
MFG. APPR.	<i>JP</i>	D407-667-245	SHEET 1 OF 4
APPROVED	<i>JP</i>	TITLE	SCALE
DE APPR.	<i>JP</i>	CROSSTUBE ASSY (407 HIGH AFT)	NTS
DATE	08.11.06	COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

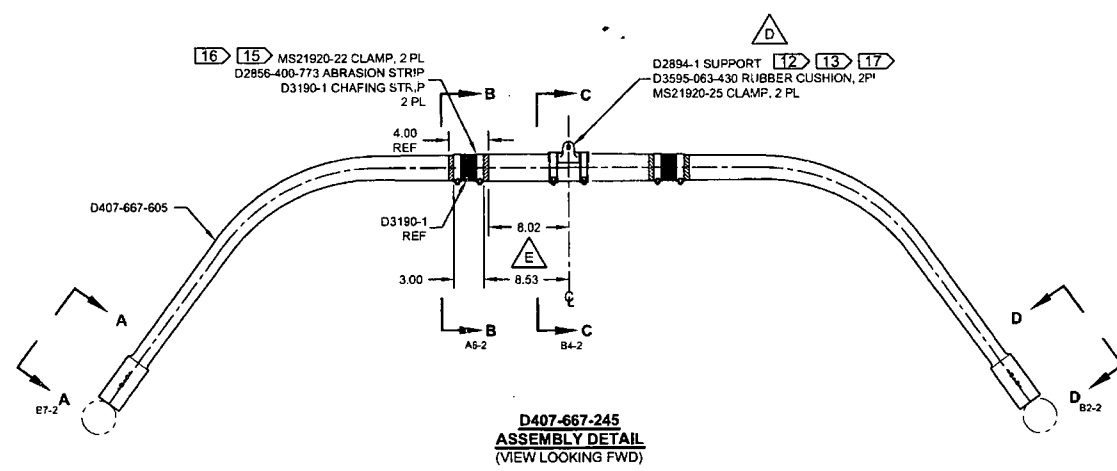
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Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

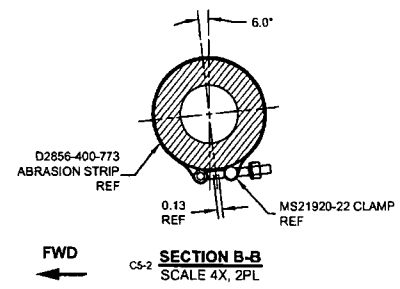
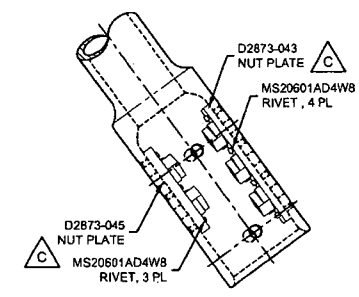
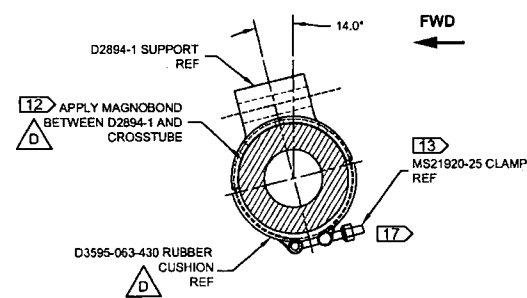
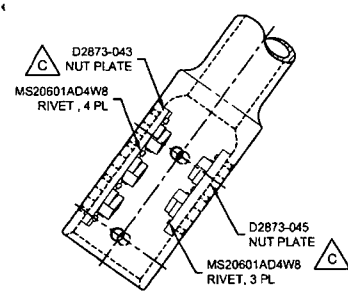
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

8 7 6 5 4 3 2 1



u/o 43862



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09/11/12

DESIGN	97	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	JP	DRAWING NO.	REV. F
MFG. APPR.	JP	D407-667-245	SHEET 2 OF 4
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8 7 6 5 4 3 2 1

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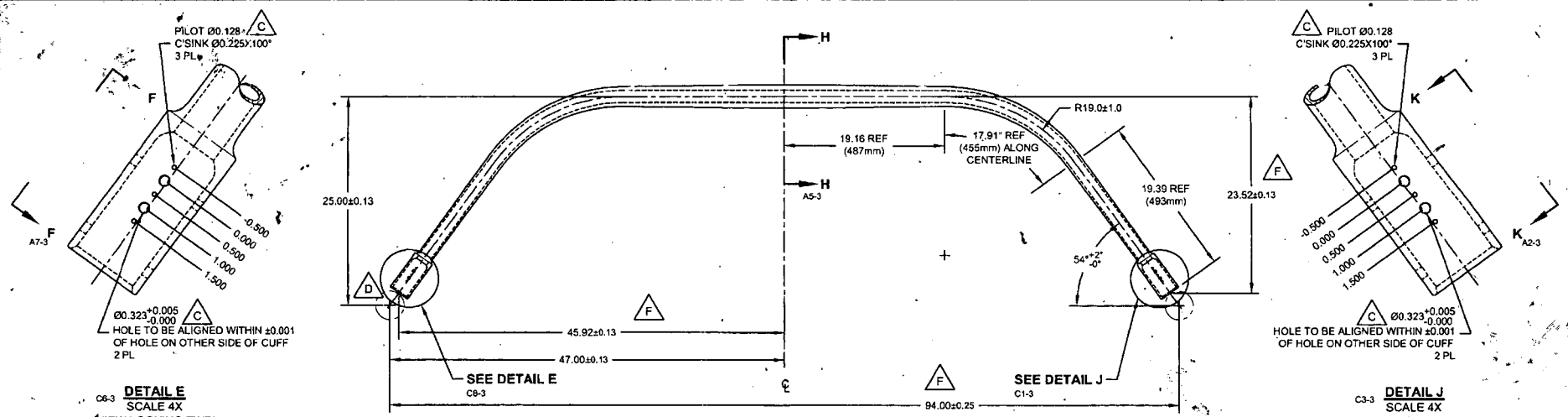
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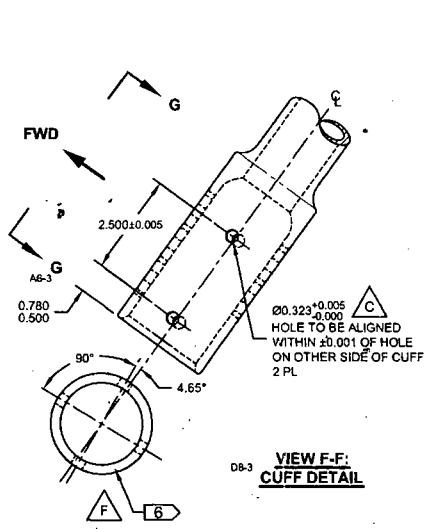


DETAIL E
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(VIEW LOOKING FWD)

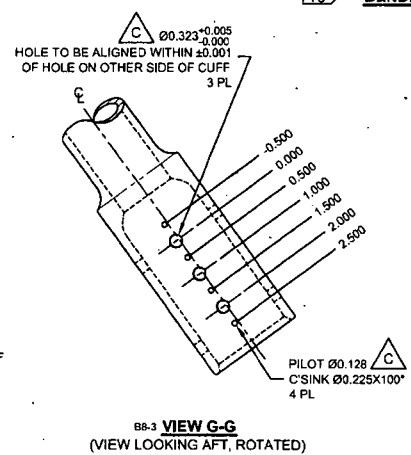
DETAIL J
SCALE 4X
(VIEW LOOKING FWD)

D407-667-605
BENDING AND DRILLING DETAIL
(VIEW LOOKING FWD)

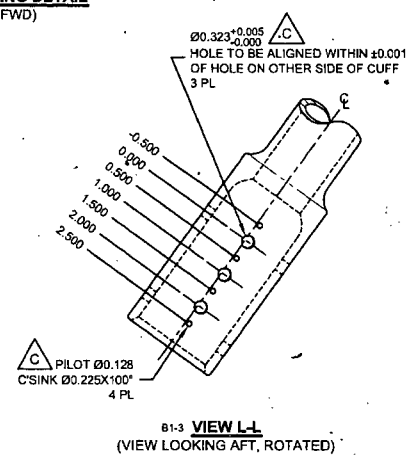
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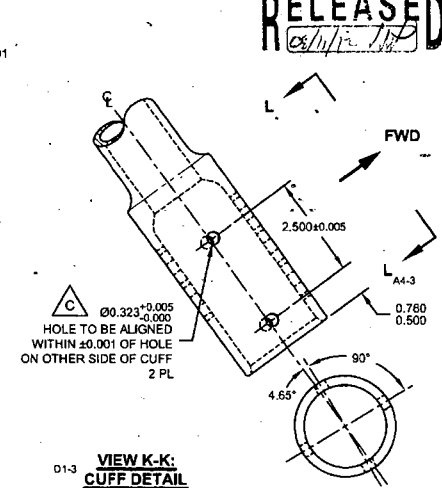
VIEW F-F:
CUFF DETAIL



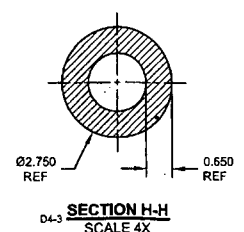
VIEW G-G
(VIEW LOOKING AFT, ROTATED)



VIEW L-L
(VIEW LOOKING AFT, ROTATED)



VIEW K-K:
CUFF DETAIL



SECTION H-H
SCALE 4X

W/O 43862

DESIGN		DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO. D407-667-245	REV. F
MFG. APPR.			SHEET 3 OF 4
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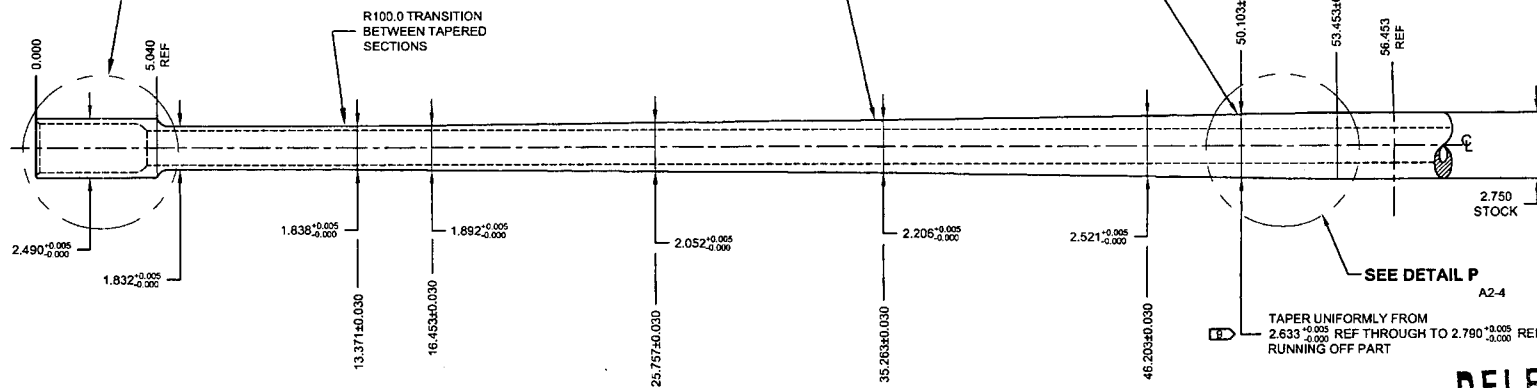
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Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

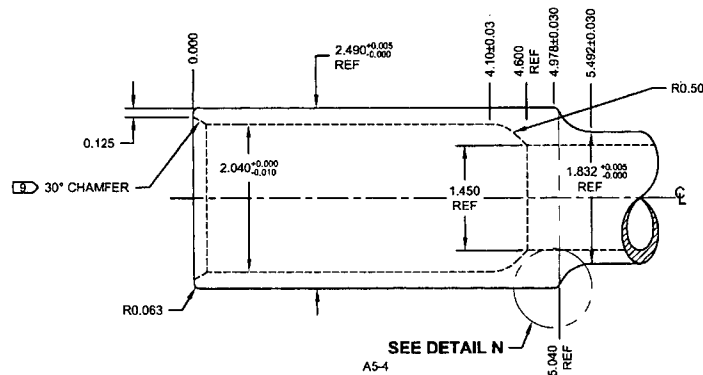
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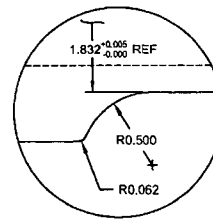
SEE DETAIL M
A7-4



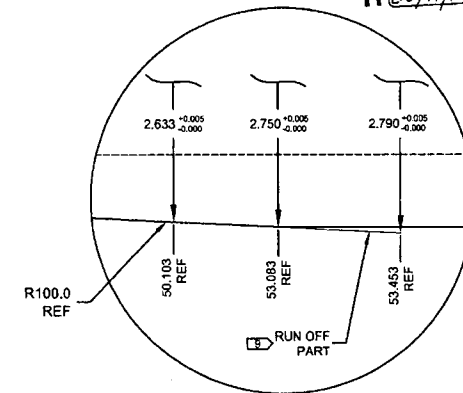
D407-667-245 MACHINING DETAIL



D8-4 **DETAIL M: CROSSTUBE CUFF**
SCALE 3X



B6-4 **DETAIL N: CUFF TRANSITION**
SCALE 2X



C14 **DETAIL P: TAPER RUN-OFF**
NOT TO SCALE

RELEASED
08/11/12 JAD

u/b 63862

DESIGN	9	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	4	DRAWING NO.	REV. F
MFG. APPR.	4	D407-667-245	SHEET 4 OF 4
APPROVED	4	TITLE	SCALE
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LIQUID PENETRANT TEST REPORT

P- 15200

PAGE 1 OF 1

CLIENT DART AEROSPACE DATE DEC-21-2010 TIME AM ☒ PM ☐
ATTENTION LINDA LACELLE ACUREN JOB NO. 188-10-0971
ADDRESS 1270 ABELDEEN PO/VO NO. 13181
HAWKESBURY, ONT. WORK LOCATION HAWKESBURY PLANT
ACCEPTANCE STD. ASTM 1417 REV./DATE 2005
PROJECT FPI ON CROSS TUBES
ITEM(S) EXAMINED 4 UNITS

JOB DESCRIPTION PROCEDURE NO. LT002 REV./DATE 2008 TECHNIQUE NO. LT002 REV./DATE 2008
PART NO. --- MATERIAL ALUMINUM THICKNESS VARIOUS
SCOPE A WET FLOUORESCENT LIQUID PENETRANT EXAMINATION.
WAS COMPLETED 100% EXTERNAL.

TEST DETAILS
METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
FAMILY BRAND MAGNAFLUX BLACK LIGHT S/N 16459 ☐ OUTPUT > 1000 μ W/cm² ☐ AMBIENT < 2 fc
PENETRANT 2LG7 MINIMUM DWELL TIME 450 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN. OTHER LABINO
DEVELOPER SKD 5.2 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N 1098866 CAL DUE DATE 06-19-2011
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE
SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☒ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL
SURFACE TEMPERATURE ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- ☐ METRIC ☐ IMPERIAL

1 CROSS TUBE-W.O. 63862 ✓
1 CROSS TUBE-W.O. 63863 ✓
1 CROSS TUBE-W.O. 63986 ✓
1 CROSS TUBE-W.O. 63985 ✓

10-12-21

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES
CLIENT REPRESENTATIVE Jan Titley PRINT SIGNATURE [Signature] DTR # E 63236
TECHNICIAN (SIGNATURE): [Signature] REPORT REVIEWED BY:
NAME (PRINT): Mike Johnston 1st TECHNICIAN 2nd TECHNICIAN
CGSB LEVEL II SNT LEVEL --- CGSB LEVEL --- SNT LEVEL ---
CGSB REG. No. 6606 CGSB REG. No. ---